The Effect of Money Market Certificates of Deposit on the Monetary Aggregates and Their Components

By ***Scott*** *Winningham*

On June 1, 1978, the Federal Reserve System and other regulatory agencies gave banks and nonbank thrift institutions the authority to issue a new type of time deposit called a money market certificate of deposit. The action was taken to prevent rising market interest rates from adversely affecting the flow of savings into financial institutions. As authorized, MMC's bear a maximum interest rate that changes each week with the average yield on new issues of 6-month Treasury bills, mature in six months, and require a minimum denomination of $10,000. Commercial banks may pay the 6-month Treasury bill rate, and nonbank thrift institutions one-quarter percentage point more.[1]

This article analyzes the effects of MMC's on the monetary aggregates and their components.[2] As is well known, the monetary aggregates play an important role in the conduct of monetary policy. The Federal Reserve System regularly establishes ranges for the growth rates of the aggregates that appear to be consistent with the ultimate goals of monetary policy. For this reason, it is important to know how MMC's have influenced the monetary aggregates. The first section of this article provides a framework within which the analysis is conducted. The second section describes the behavior of the monetary aggregates and their components both before and after the introduction of MMC's. The last section presents estimates of the effects on the monetary aggregates and their components of the introductibn of MMC's.

A FRAMEWORK OF ANALYSIS

The effect of MMC's on the monetary aggregates can be analyzed by reference to a short-run model of the demand and supply factors determining the components of the

1 Effective March 15, 1979, the quarter-point interest rate differential between commercial banks and nonbank thrifts was eliminated whenever the ceiling rate is 9 per cent or more. The use of compounding was also prohibited. For more information on these changes in the rules governing the issuance of MMC's, see ***Federal Reserve Bulletin,*** Vol. *65,* No. 3 (March 1979), pp. 247-48.

2 The monetary aggregates considered in this article are M1, which consists of currency and demand deposits (checking account balances) held by the nonbank public; M2, which is equal to M1 plus time and savings deposits at commercial banks other than large negotiable certificates of deposit at weekly reporting banks; and M3, which is equal to M2 plus time and savings deposits at nonbank thrifts.

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aggregates. Traditional theories postulate that the demand for monetary assets depends on real income, prices, and interest rates.[3] As real income rises the demand for monetary assets generally increases, as the public attempts to keep a stable relationship between its money balances and its real income. Rising prices tend to be accompanied by increases in nominal monetary assets as the public seeks to maintain the purchasing power of its money balances. Rising market interest rates, on the other hand, generally result in declines in monetary assets, as the public shifts into alternative financial assets in order to maximize interest income. However, increases in the interest rate on MMC's or other time and savings deposits are associated with increases in some monetary assets, such as MMC's or other time and savings deposits, and with declines in the other monetary assets.[4]

The supply factors affecting the components of the monetary aggregates are those factors controlled mainly by monetary policy. In brief, supply factors depend on the actions of the Federal Reserve System in supplying bank reserves or base money. The Federal Reserve System can determine market interest rates by allowing the supply of bank reserves or base money to vary. Under this type of interest rate policy, the quantity of funds held in each monetary asset adjusts according to how the monetary authorities adjust market interest rates.

The process by which demand and supply factors determine the components of the monetary aggregates is illustrated below with a simple set of equations. Equation (1) indicates that the public's demand for real currency balances (CURR/P) depends on real income (INC/P), the interest rate on time and savings deposits other than MMC's (i_{TSD}), the MMC interest rate (i_{MMC}), and the rate of interest on an alternative financial asset (i).[5]

$$(1)\quad CURR/P = f(INC/P, i_{TSD}, i_{MMC}, i).$$

Equations (2) through (4) show that the same variables determine the demand for real money balances held in demand deposits, time and savings deposits other than MMC's, and MMC's.

$$(2)\quad DD/P = f(INC/P, i_{TSD}, i_{MMC}, i),$$

$$(3)\quad TSD/P = f(INC/P, i_{TSD}, i_{MMC}, i),$$

$$(4)\quad MMC/P = f(INC/P, i_{TSD}, i_{MMC}, i).$$

The supply factors determining the components of the monetary aggregates are summarized in equation (5).

$$(5)\quad BASE = CURR + RES.$$

Equation (5) indicates that the supply of base money (BASE) equals the demand for base money, which consists of the demand for nominal currency balances by the public plus the demand for reserves (RES) by banks. Banks' demand for reserves depends on the public's demand for deposits, the reserve requirements imposed by the regulatory

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3 See, for example, William J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach," *Quarterly Review of Economics*, Vol. 66 (November 1952), pp. 545-56.

4 The interest rates on the deposit components of the monetary aggregates are subject to ceilings set by the regulatory authorities. The ceiling on demand deposits has been zero since the 1930s. However, the ceilings on time and savings deposits at commercial banks and at nonbank thrifts have increased, although generally not by as much as market interest rates.

5 There are obviously many other alternative financial assets in which the public may consider holding funds, but for the sake of simplicity only one is considered.

authorities, and other factors. The supply of base money depends on actions of the Federal Reserve System. There are two alternative ways of viewing the role of the Federal Reserve System. The System may be viewed as supplying a given amount of base money and allowing interest rates and other variables to adjust.[6] The second alternative, which is adopted in the analysis that follows, views the Federal Reserve as allowing the monetary base to vary in whatever way is necessary to achieve given levels of interest rates and other variables.

Equations (1) through (5) can be used to illustrate how the components of the monetary aggregates are determined by demand and supply factors. For example, suppose that the Federal Reserve System wants to set the market interest rate at 10 per cent. Suppose further that when the interest rate is 10 per cent, the public desires to hold $100 billion in currency, $250 billion in demand deposits, $400 billion in other time and savings deposits, and $100 billion in MMC's. Finally, suppose that banks want to hold $50 billion in reserves, given the public's desired deposit holdings, reserve requirements, and other factors affecting banks' demand for reserves. Then, according to equation (5), the total demand for base money would be $150 billion—*i.e.*, the $100 billion in currency demand and the $50 billion in demand for reserves. Thus, the Federal Reserve System must supply $150 billion in base money to maintain the market rate of interest at 10 per cent. Also, given the $150-billion supply of base money, an equilibrium exists in the market for base money, and the components of the aggregates are determined.

Since these equations determine the components of the aggregates, they also determine the monetary aggregates themselves. For example, the solution for M1 is obtained by combining the solutions for currency and demand deposits. In a similar manner, solutions for M2 and M3 can be obtained as well.

The equations can also be used to show how the introduction of MMC's affects the aggregates and their components. Before June 1, 1978, MMC's were no different from other time deposits of similar maturity, because their interest rates were fixed by effective ceilings set by the regulatory authorities. After June 1, 1978, however, MMC's were distinct from other time and savings deposits because their interest rate ceiling was allowed to vary with a market interest rate—that of 6-month Treasury bills. Equation (6) reflects this change by expressing the MMC interest rate in terms of i, the only market interest rate appearing in equations (1) through (5).

$$(6)\quad i_{MMC} = f(i).$$

Thus, equations (1) through (5) can be used to determine the components and aggregates for the period before MMC's were introduced, and equations (1) through (6) can be used for the period after MMC's were introduced. A comparison of the two sets of solutions allows one to ascertain the effects on the components and aggregates of the introduction and spread of MMC's.[7]

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6 In a short-run analysis such as this, real income and prices are not appreciably affected by changes in market interest rates and base money. Therefore, they can reasonably be assumed as given. The interest rate on time and savings deposits may reasonably be assumed as given at the ceiling rate set by the regulatory authorities. Determination of the MMC interest rate is discussed below.

7 With the introduction of MMC's, individuals no doubt required time to adjust their portfolios to take account of the changed economic environment. This dynamic adjustment process is not captured by the present model. Instead, for simplicity's sake, the present model compares only the equilibrium conditions before and after the

For example, if the interest rate on MMC's is allowed to increase relative to the rate paid on other time and savings deposits, the demand for MMC's would increase, and the demand for currency, demand deposits, and other time and savings deposits would fall. Since MMC's are probably not close substitutes for either currency or demand deposits, a rise in the rate on MMC's would probably decrease only slightly the demand for these two monetary assets. However, since MMC's are close substitutes for other time and savings deposits, a rise in the rate on MMC's would decrease the demand for these deposits more than the demand for currency or demand deposits. On balance, the increased demand for MMC's would probably more than offset the decreased demands for currency, demand deposits, and other time and savings deposits. This is because some of the increased demand for MMC's would reflect a reduced demand for financial assets other than currency and deposits.

The effect of MMC's on the aggregates depends not only on demand factors, but on supply factors determined by the Federal Reserve System. If the System accommodates the introduction of MMC's by not altering its policy toward market interest rates, demand factors would determine the components and aggregates, while the supply of base money would be adjusted to maintain an equilibrium in the market for base money. In this case, currency, demand deposits, and **M1** would decline slightly due to a rise in the interest rate on MMC's, other time and savings deposits would probably decrease substantially, and M2 and M3 would likely increase somewhat.

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introduction of MMC's. That is, the model assumes all adjustment has taken place. For this reason, the model is said to be static rather than dynamic. The estimates in section three of the effects of MMC's incorporate some of the dynamic elements involved with the introduction and spread of MMC's.

For example, suppose the increase in the interest rate on MMC's results in an increase of $20 billion in the demand for MMC's, and decreases of $1 billion, $2 billion, and $10 billion, respectively, in the demand for currency, demand deposits, and other time and savings deposits. This would imply either an increase or a decrease in the demand for base money, depending on the size of reserve requirements as well as other factors. If the Federal Reserve maintains unchanged market interest rates, the supply of base money would increase or decrease to ensure an equilibrium, and the change in the amounts outstanding of the components would be the same as the change in their demands. Thus, in this particular example, **M1** would decline by $3 billion ($1 billion in currency and $2 billion in demand deposits). M2 or **M3—depending** on whether the above data on MMC's and other time and savings deposits referred to commercial banks or to all financial institutions — would increase by $7 billion ($20 billion in MMC's minus $10 billion in other time and savings deposits minus $3 billion in **M1**).

On the other hand, the Federal Reserve System may decide not to accommodate completely the introduction of MMC's by allowing base money to vary, instead allowing market interest rates to adjust. These rates may rise or fall,, depending on whether the higher interest rate pn MMC's leads to an increase or a decrease in the demand for base money. For example, suppose, as may be reasonable, that the increase in the interest rate on MMC's leads to an increase in the demand for base money. If the Federal Reserve does not accommodate this increased demand, market interest rates would rise, thereby partly offsetting the increased demand for MMC's and reducing further the demands for currency, demand deposits, and time and savings deposits net of MMC's. Consequently, MMC's

Table 1
MONEY MARKET CERTIFICATES OF DEPOSIT
(Monthly averages in billions of seasonally unadjusted dollars)

	Net Inflows			Total Outstanding		
	Commercial Banks	Nonbank Thrifts	Total	Commercial Banks	Nonbank Thrifts	Total
June 1978	1.1	3.5	4.6	1.1	3.5	4.6
December 1978	4.6	9.0	13.6	21.4	49.5	70.9
March 1979	4.6	8.8	13.4	38.6	85.1	123.7

SOURCES: Board of Governors of the Federal Reserve System, Federal Home Loan Bank Board, and author.

would increase by less and the other components would decline by more than before. Similarly, there would be a greater decline in M1 and smaller increases in M2 and M3.

Since the effect of MMC's on the aggregates appears to depend on how the Federal Reserve System responds to the introduction of MMC's, it is useful to review the current procedure for implementing monetary policy. Although the Federal Reserve System monitors a number of economic indicators, including bank reserves and base money, the Federal funds rate is the primary day-to-day vehicle of monetary policy used by the System's open market account manager. The Federal funds rate objective is the estimate of this interest rate that appears to be consistent with desired short-run growth rates of the monetary aggregates. If this rate comes under pressure due to MMC's, the immediate response of the account manager probably would be to absorb or add enough bank reserves or base money to hold the funds rate steady. Thus, monetary policy probably would initially be accommodative to the introduction of MMC's. In the longer run, monetary policymakers may estimate to what extent pressure on the funds rate is due to the effects of MMC's and adjust the funds rate objective accordingly. An accommodative policy toward MMC's may be more likely, however, even in the longer run. If so, the introduction and spread of MMC's would be expected to have a relatively small negative impact on the growth of currency, demand deposits, and M1, a somewhat greater negative impact on the growth of time and savings deposits net of MMC's, and positive impact on the growth rates of M2 and M3.

THE BEHAVIOR OF THE AGGREGATES AND COMPONENTS BEFORE AND AFTER THE INTRODUCTION OF MMC'S

This section compares the actual behavior of the monetary aggregates and their components during a 10-month period ending in March 1979 with their behavior during the 10 months immediately preceding the introduction of MMC's. The purpose is to provide information about the impact MMC's have had on the money supply measures.

Table 1 shows that MMC's have increased sharply since their introduction in June 1978. By March 1979, $123.7 billion of these deposits were outstanding. Of this total, $38.6 billion was at commercial banks and $85.1 billion at nonbank thrift institutions.

Table 2 presents the annual growth rates of the components and aggregates over the two 10-month periods. The greatest difference in the component growth rates occurred in time and savings deposits net of MMC's. These

deposits increased at rates of 8.1 per cent at commercial banks and 11.2 per cent at nonbank thrifts between July 1977 and May 1978. After MMC's were introduced, however, these deposits actually declined by 1.0 per cent at commercial banks and 6.6 per cent at nonbank thrifts. M1's growth rate also declined after the introduction of MMC's as the growth rate of demand deposits declined and the growth rate of currency remained unchanged.

Table 2
GROWTH RATES OF SELECTED VARIABLES
(Seasonally adjusted annual rates)

Variable	July 1977 to May 1978	May 1978 to March 1979
Currency	9.7	9.7
Demand Deposits	7.5	0.3
Time and Savings Deposits:*		
Commercial Banks:		
Inclusive of MMC's	8.1	8.5
Net of MMC's	8.1	–1.0
Nonbank Thrifts:		
Inclusive of MMC's	11.2	10.8
Net of MMC's	11.2	–6.6
Total:		
Inclusive of MMC's	9.8	9.8
Net of MMC's	9.8	4.1
M1	8.0	2.8
M2	8.1	6.1
M3	9.4	8.1
Real Personal Income†	4.3	2.4
Consumer Price Index	7.0	9.8
Interest Rate on Commercial Paper‡	37.7	48.1

*Excludes large negotiable certificates of deposit at weekly reporting commercial banks.
†Real personal income is personal income adjusted to exclude the effect of changes in the consumer price index.
‡The 4- to 6-month prime commercial paper rate is used as a measure of market interest rates.

The growth rates of M2 and M3 also decelerated. The decline in M2's growth rate mainly reflected the deceleration in the growth rate of M1. As Table 2 shows, the growth rate of the time deposit component of M2—time and savings deposits at commercial banks inclusive of MMC's—accelerated slightly. The decline in the growth of M3 was also due to the slower M1 growth rate. There was no change in the growth rate of the time deposit component of M3—time and savings deposits at commercial banks and nonbank thrift institutions inclusive of MMC's.

In some respects, the actual behavior of the aggregates and their components is consistent with what would have been expected following the introduction of MMC's, particularly the sharp decline in the growth rate of time and savings deposits net of MMC's. Moreover, the fact that the growth rate of time and savings deposits inclusive of MMC's did not decline was also to be expected, since the decline in other time and savings deposits was offset by the growth of MMC's.

Certain behavior of the aggregates, however, is not in line with expectations. The analysis of the previous section indicated that MMC's would be expected to result in an acceleration in the growth rate of time and savings deposits inclusive of MMC's, because part of the funds flowing into MMC's would come from assets other than time and savings deposits. That acceleration, though, did not occur. Also, the introduction of MMC's was expected to have only a small negative impact on M1, and not the sharp decline that actually occurred. Moreover, the impact on M2 and M3 was expected to be positive, because the positive impact of MMC's on time and savings deposits was expected to more than offset the negative impact on M1. In general, then, after MMC's were introduced, the growth rates of the monetary aggregates were lower than would

have been expected to result from the introduction of these instruments.

Part of the lower growth rates can be explained by factors other than the introduction of MMC's. For example, Table 2 shows that the interest rate on commercial paper rose at an accelerated pace after MMC's were introduced. As a result, increased market interest rates tended to depress the growth rates of the components and aggregates. The table shows that real personal income decelerated after MMC's were introduced, and this deceleration also tended to decrease the growth rates of the aggregates. On the other hand, the acceleration in the consumer price index tended to increase the aggregate growth rates.

The difference between the growth rates of the aggregates before and after the introduction of MMC's may have been caused by still other factors. Balances in money market mutual funds increased sharply after May 1978, and automatic transfer accounts have grown rapidly since becoming available to household depositors on November 1, 1978. These two competing assets may have drawn funds from some of the components and, hence, may have been partly responsible for some of the behavior of the aggregates shown in Table 2.

ESTIMATES OF THE EFFECT OF MMC'S ON THE AGGREGATES AND COMPONENTS

The purpose of this section is to account more explicitly for how MMC's and other factors may have influenced the aggregates and their components. The method used is first to specify certain equations relevant to the public's demand for the components of the aggregates, and then to estimate the equations through regression analysis.[8]

The regression equations employed are similar to the demand equations presented in the first section of this article. However, some changes are made to facilitate statistical analysis. For example, the general form of the regression equation estimated for currency is as follows:

$$(7)\ CURR/P = f(INC/P, i, ATS, MMC, MMMF, MSHIFT, e).$$

Real income and a market interest rate appear as explanatory variables, as in equation (1) of the first section. However, data limitations prohibit including an interest rate on other time and savings deposits. ATS, MMC, and MMMF are the outstanding nominal balances in automatic transfer accounts, MMC's, and money market mutual funds, respectively. An assumption of this article is that these variables adequately capture the structural shifts that occurred in financial markets with the introduction and spread of automatic transfers, MMC's, and money market mutual funds. Thus, for example, as the public becomes more aware of MMC's, the variable MMC increases and the demand for each component presumably declines. Similarly, an increase in ATS or MMMF is assumed to cause a decrease in the demand for other assets.[9] MSHIFT is included to capture an apparent shift in the demand for

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[8] The regression equations used monthly data through March 1979. The data from April 1979 were not included since they apparently were heavily influenced by seasonal factors having nothing to do with MMC's. For more information on the methodology and results described in the remainder of this section, see Scott Winningham, "The Effect of Money Market Certificates of Deposit on the Monetary Aggregates and Their Components: An Empirical Investigation," unpublished Research Working Paper, Federal Reserve Bank of Kansas City.

[9] In principle, the demand for monetary assets depends on the yields on all competing assets. Thus, the interest rate on automatic transfers, MMC's, and money market mutual funds should be included in the regression equations for the components instead of the outstanding quantities of these competing assets. An increase in any of these interest rates would presumably reduce the demand for each monetary asset. Unfortunately, data on such interest rates are not

Table 3
ESTIMATED CHANGES IN THE COMPONENTS AND AGGREGATES DUE TO THE INTRODUCTION AND SPREAD OF MMC'S
(May 1978 to March 1979)

Components	In Billions of Seasonally Adjusted Dollars	In Percentage Points at a Seasonally Adjusted Annual Rate	T-Statistic
Currency	1.46	1.90	0.66
Demand Deposits	– 3.87	– 1.79	–0.51
Other Time and Savings Deposits at Commercial Banks	–28.31	– 6.99	–1.91
Other Time and Savings Deposits at Nonbank Thrift Institutions	–73.86	–15.14	–4.59
MMC's at Commercial Banks	38.60	n.a.	n.a.
MMCs at Nonbank Thrift Institutions	85.10	n.a.	n.a.
Aggregates			
M1	– 2.41	– 0.82	n.a.
M2	7.88	1.13	n.a.
M3	19.12	1.61	n.a.

n.a. = not available.

money in the mid-1970s,[10] and e is a disturbance term.

Regression equations are also estimated for demand deposits, time and savings deposits net of MMC's at commercial banks, and time and savings deposits net of MMC's at nonbank thrifts. The equations for these other components have the same general form as equation (7) for currency.[11]

Table 3 shows the estimated effect of MMC's on the components and aggregates. The estimated dollar changes of the components are derived using the regression results.[12] Changes

readily available. More importantly, during the time that the public was learning about and adjusting to automatic transfers, MMC's, and money market mutual funds, changes in the interest rates on these competing assets may not have been as important in explaining the demand for them and for the components as would normally be the case. For these reasons, the variables ATS, MMC, and MMMF are included in the regression equations instead of the corresponding interest rates.

10 Several researchers have attempted to account for this "missing money," but with less than total success. See, for example, Jared Enzler, Lewis Johnson, and John Paulus, "Some Problems of Money Demand," Brookings Papers on Economic Activity. No. 1, 1976, pp. 261-80; Steven M. Goldfeld, "The Case of the Missing Money," Brookings Papers on Economic Activity. No. 3, 1976, pp. 683-730; and Michael J. Hamburger, "Behavior of the Money Stock: Is There a Puzzle?" Journal of Monetary Economics. Vol. 3 (July 1977), pp. 265-88. For present purposes it is deemed sufficient simply to include MSHIFT as an explanatory variable. A more rigorous treatment of this apparent shift is of course preferable but is beyond the scope of this article.

11 Automatic transfer balances are deleted from time and savings deposits net of MMC's at commercial banks prior to the estimation of this component's demand equation in order to remove an obvious source of simultaneous equations bias caused by the presence of ATS as an explanatory variable.

12 In general, the regression results have desirable properties. For each component, the estimated partial elasticities with respect to real income and the market interest rate conform to prior expectations regarding sign

in the components resulting from a $1 increase in MMC's can be determined from the estimated coefficients on the variable MMC. Multiplying these amounts by total MMC balances yields the estimated dollar changes in the components. The estimated dollar changes in the aggregates are obtained by adding together the estimated dollar changes in the relevant components. The reported t-statistics in Table 3 are measures of the degree of confidence that can be placed in the estimates. The larger a t-statistic, ignoring its sign, the greater is the degree of confidence. A t-statistic of -2.00, for example, means there is roughly a 95 per cent probability that the estimate is negative.

The estimates in Table 3 suggest that the introduction and spread of MMC's had little effect on either currency or demand deposits. The estimated changes for both components are relatively small. Apparently, the slowdown of demand deposits in late 1978 and early 1979 was largely due to factors other than the introduction and spread of MMC's.

The results in Table 3 also suggest that by March 1979 time and savings deposits net of MMC's were lower by approximately $28 billion at commercial banks and $74 billion at nonbank thrifts due to MMC's. Since these amounts represent about 23 and 60 per cent, respectively, of total MMC balances in March 1979, it appears that more than three-fourths of MMC's may have been drawn from other time and savings deposits. Thus, since demand deposits were apparently little affected by MMC's, perhaps one-fourth or less of MMC balances are "new money" for financial institutions. In terms of rate of change, the introduction and spread of MMC's may have lowered the annual growth rate of time and savings deposits net of MMC's by about 7 percentage points at commercial banks and 15 percentage points at nonbank thrifts between May 1978 and March 1979.

The results for the monetary aggregates follow directly from those for the components. MMC's appear to have had little effect on M1. MMC's probably increased M2 and M3 because the increases in MMC balances more than offset the decreases in other deposits. The estimates in Table 3 suggest that the introduction and spread of MMC's increased M2 and M3 by about $8 and $19 billion, respectively. These amounts represent increases of 1.1 and 1.6 percentage points, respectively, in the annual growth rates of M2 and M3 between May 1978 and March 1979.

SUMMARY

This article has examined the implications of MMC's for the monetary aggregates and their components. The theoretical analysis in the first section of the article suggested that all the components of the monetary aggregates, except MMC's, would decrease due to the introduction of MMC's. The extent of the declines in the components would depend on how closely substitutable MMC's are for these component~. Thus, one would expect MMC's to substantially

and size and are significantly different from zero. The estimated coefficients on ATS, MMC, and MMMF have the hypothesized signs, except for those on ATS and MMC in the currency equation and on ATS in the equation for other time and savings deposits at nonbank thrifts. The estimated coefficients on MMMF are generally larger in absolute value than anticipated. For example, the results suggest that a $1 increase in money market mutual fund balances reduces the demand for other time and savings deposits at nonbank thrifts by $1.44. Such large coefficients may have been obtained because the variable MMMF captures the effect of factors other than money market mutual funds. Repurchase agreements, for example, have grown in importance over roughly the same period as have money market mutual funds, but their effect on monetary assets could not be accounted for separately due to data limitations. MSHIFT behaves as expected in the equations. Finally, for all of the components, the Durbin-Watson statistics suggest an absence of first-order autocorrelation after prefiltering.

decrease time and savings deposits net of MMC's but only marginally decrease currency and demand deposits. Since M1 consists of currency and demand deposits, M1 would be expected to decline marginally due to MMC's. In contrast, M2 and M3 include MMC's as well as other time and savings deposits. For this reason, there are likely to be offsetting effects of MMC's on these two monetary aggregates. Theoretically, M2 and M3 would probably increase due to MMC's because the MMC balances in these aggregates probably would increase by more than the other components of these aggregates decrease.

The next two sections of the article presented, empirical evidence concerning the effects of MMC's on the aggregates and their components. Section two described the behavior of the components and aggregates before and after the introduction of MMC's. Section three presented estimates of the effects of MMC's based on regression analysis. The analysis yielded results that are consistent with the results suggested by the theoretical analysis in the first section. The results indicated that the introduction and spread of MMC's apparently had little effect on currency, demand deposits, and M1. However, MMC's probably caused time and savings deposits net of MMC's to be substantially lower than they otherwise would have been, but may have increased M2 and M3 somewhat.

Two New Booklets Published

Teenage unemployment has nearly doubled in the last decade, according to Steven P. Zell, a business economist with the Federal Reserve Bank of Kansas City, in his booklet, ***The Growth of Youth Unemployment: Characteristics and Causes.*** Even though the economic recovery has increased employment for all age groups, teenage unemployment rates have reached extremely high levels, especially for members of minority groups.

The sources of growth in teen unemployment, the impact of the minimum wage, and the implications of the findings are discussed in this informative new booklet.

The dramatic rise in the value of farmland in recent years is discussed by Marvin Duncan, assistant vice president and agricultural economist with the Federal Reserve Bank of Kansas City, in Farm ***Real Estate Values: What's Happening and Why.*** The booklet notes that farmland has become an increasingly attractive investment in recent years for both farmers and nonfarmers. Yet virtually all farmland that changes hands each year is purchased by **U.S.** citizens, and about two-thirds of that by farmers.

The booklet compares the relative importance of various determinants of the value of farm real estate, discusses in detail who is buying the land, and examines how sales are being financed.

Copies of both booklets are available free of charge by writing to the Research Division, Federal Reserve Bank of Kansas City, 925 Grand Avenue, Kansas City, Missouri 64198.